Little Dome C

Beyond EPICA Oldest Ice Drilling Site (75.29917 °S, 122.44516 °E)

Situation Report #24, 10th December 2025

Personnel @LDC:
Carlo Barbante (UNIVE, CNR-ISP, PI in the field), Gianluca Bianchi Fasani (ENEA, Camp Leader), Katrin Ederer (AWI), Matthias Hüther (AWI, Chief Driller), Marion Lahuec (IPEV), Gunther Lawer (AWI), Johannes Lemburg (AWI), Barbara Seth (UNIBE), Philippe Possenti (CNRS), Chiara Venier (CNR-ISP), Sergio Zannini (ENEA), Mohammad Vafadarmianvelayat (AWI)

Personnel @DC:
Iben Koldtoft

Weather at LDC: sunny and cold
Meteo at DC 09 pm: T = −32.9 °C, Wind speed = 4.1 kt, Windchill T = −41°C, Humidity = 66 %

LDC is buzzing with activity as the intricate process of fine-tuning the deep-drilling system continues, and we're seeing tangible improvements that fill us with optimism for the weeks ahead.

Today, several minor, yet critical, adjustments led to perceptible improvements in the system's operational stability, a huge psychological and technical boost for everyone on site. The crew's expertise and persistence are truly shining through.

Today, we started reaming using the deviation tool designed by our Danish colleagues. We knew that it takes time, lots of time, but after 12 ups and downs we realised that we are not reaming efficiently as we cannot make out a ledge at the bottom of the reaming length (2352 m). Hence, we consulted the Danish group again and took the advice for some changes:

- We turned down the mounting screws on the drill head by 1 mm.
- We cut off part of the width of the flank behind the cutters' guiding edges.
- We increased the tension of the spring of the deviation tool by 5 mm.

We can't wait to apply these changes on Thursday when doing up to 40 ups and downs again…

On the personnel front, we're happy to report a key arrival! Iben Koldtoft has successfully completed the long journey from the Mario Zucchelli Station (MZS) and is now safely at the Franco-Italian Concordia Station, a mere 34 kilometers from our field camp. Iben's expertise will soon be invaluable at Little Dome C. Before joining us, however, she must undergo a necessary period of altitude acclimatization at Concordia.

Working and living at Concordia Station (and Little Dome C, which shares a similar altitude) is a unique physiological challenge. The station, located on the Antarctic Plateau, sits at an altitude of approximately 3,233 meters above sea level. However, due to the extreme cold and other atmospheric factors, the effective altitude—the one the human body feels—is often much higher, sometimes approaching what you would experience at over 3,800 meters.

The primary physiological issue is hypoxia, or a reduced oxygen supply to the body tissues. At this altitude, the air pressure is lower, meaning that with every breath, your lungs take in significantly fewer oxygen molecules than they would at sea level.

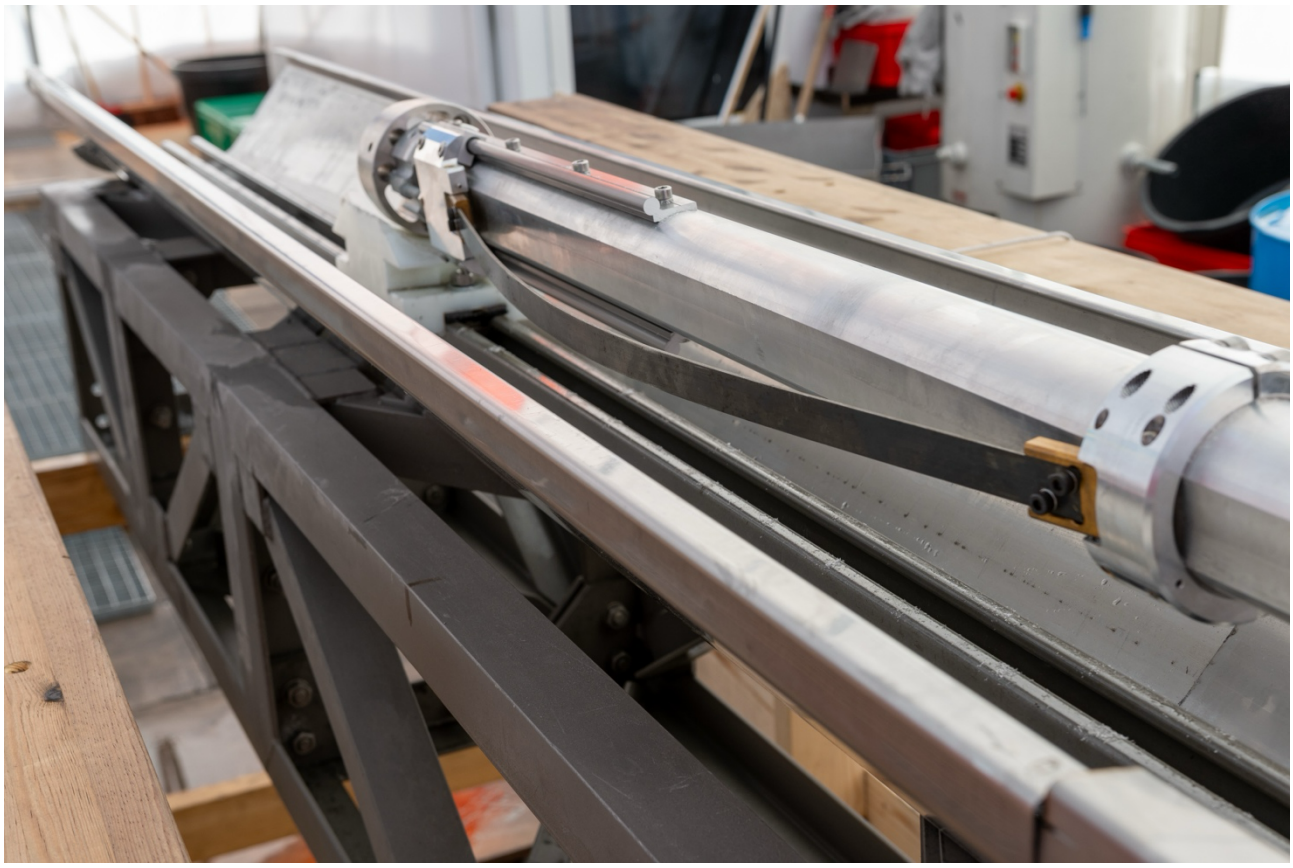
When a person first arrives, the body immediately attempts to compensate. Breathing becomes faster and deeper to increase oxygen intake. The heart rate also increases to pump the available oxygenated blood more rapidly throughout the body. This is why the first few days are tiring and can be accompanied by

symptoms like headache, nausea, and shortness of breath, collectively known as Acute Mountain Sickness (AMS).

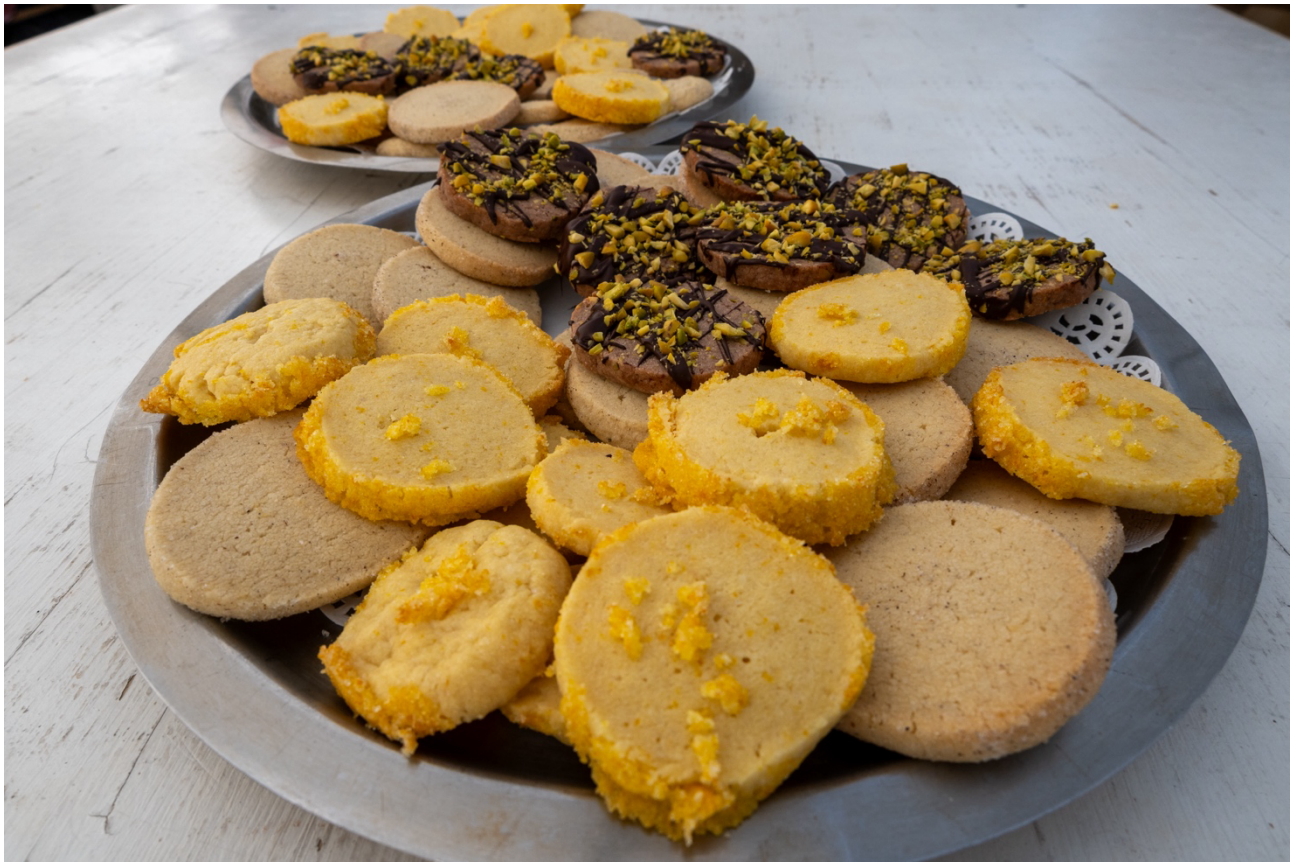
Over a period of days to weeks, the body undergoes remarkable changes: The kidneys signal the body to produce more red blood cells. These cells are the oxygen carriers, and increasing their number enhances the blood's capacity to transport oxygen. The body adjusts its fluid balance, and the structure of the lungs and circulatory system slightly modifies to improve gas exchange efficiency.

This necessary acclimatization period is why Iben (as we all have done before our deployment at LDC) must first spend time at Concordia. The body needs this critical phase to adapt to the lower oxygen environment before she joins the demanding work schedule at the Little Dome C field camp. This physiological process is crucial for safety and for ensuring that the team can perform the complex scientific and logistical tasks required for the Beyond EPICA project.

We look forward to Iben's arrival and anticipate a successful start to the deep drilling once the system passes its final tests.



The deviation tool with the spring on the side and the drill head in the back as designed by the Copenhagen group. The spring is supposed to fit into the freshly broached groove down there in our bore hole at approximately 2327 m to 2352 m depth. Hence, the spring pushes the drill head to the opposite side of the bore hole to “ream”/mill into the wall and produce the wanted ledge.. Photo by G. Lawer.



Here are the extraordinary and delicious cookies made overnight by Barbara and Chiara: chocolate and pistachio, orange, and cardamom. Truly a delight.. Photo by G. Lawer.

CB, GBF, BS & MH; LDC, 10.12.2025